

REGIONAL COMPETITION - ROUND 5

TOSS-UP

1. GENR; Short Answer: Identify the tree family that includes among its members the: fink, myrtle, turkey, jacks, laurel, white, live and pin.

ANSWER: OAK (ACCEPT QUERCUS)

BONUS

1. GENR; Multiple Choice: Which of the following vacuum pumps operates by using a very cold surface to trap the gases on the cold surface?
 - a) sublimation pump
 - b) turbo pump
 - c) cryopump
 - d) diffusion pump.

ANSWER: C -- CRYOPUMP

TOSS-UP

2. PHYS; Multiple Choice: The SI (read: S-i) unit of pressure is the:
 - a) Torr
 - b) dyne per centimeter squared
 - c) atmosphere
 - d) pascal

ANSWER: D -- PASCAL

BONUS

2. PHYS; Multiple Choice: An electroscope charged WITHOUT contacting a charged body is charged by:
 - a) induction
 - b) conduction
 - c) convection
 - d) insulation

ANSWER: A -- INDUCTION

TOSS-UP

3. BIOL; Multiple Choice: The difference between smooth and rough endoplasmic reticulum is the lack of:
- a) ATP
 - b) proteins
 - c) ribosomes
 - d) peroxisomes

ANSWER: C -- RIBOSOMES

BONUS

3. BIOL; Multiple Choice: The chloroplast carries out:
- a) photosynthesis
 - b) reproduction
 - c) secretion
 - d) packaging

ANSWER: A -- PHOTOSYNTHESIS

TOSS-UP

4. ASTR; Short Answer: What is the last planet Voyager II visited?

ANSWER: NEPTUNE

BONUS

4. ASTR; Multiple Choice: Whereas latitude and longitude are the coordinates of places on earth, what coordinates are used for star locations?
- a) ascension and polar angle
 - b) right ascension and declination
 - c) altitude and ascension
 - d) declination and polar angle

ANSWER: B -- RIGHT ASCENSION AND DECLINATION

TOSS-UP

5. CHEM; Short Answer: What is the name of the bond that joins amino acids together in a protein?

ANSWER: PEPTIDE BOND or AMIDE

BONUS

5. CHEM; Multiple Choice: A process in which substances are separated through differences in the rates at which the components migrate is called:
- a) filtration
 - b) chromatography
 - c) elution
 - d) titration

ANSWER: B -- CHROMATOGRAPHY

TOSS-UP

6. COMP; Multiple Choice: Which computer pioneer was also a Rear Admiral of the U.S. Navy?
- a) Steve Jobs
 - b) John Backus
 - c) John von Neumann
 - d) Grace Hopper

ANSWER: D -- GRACE HOPPER

BONUS

6. COMP; Short Answer: You are programming in BASIC on your PC (read P-C) You want to see all of your program statements on the CRT (read C-R-T). What command do you type?

ANSWER: LIST or L (accept "List return" or "L return")

TOSS-UP

7. BIOL; Short Answer: If two-brown haired parents with recessive genes for blonde hair have children, what are the chances of them having a blonde baby?

ANSWER: 25%

BONUS

7. BIOL; Short Answer: What is the formal name for the heaviest muscle in the human body, and that helps extend the thigh?

ANSWER: GLUTEUS MAXIMUS

TOSS-UP

8. PHYS; Multiple Choice: The potential drop between the terminals of a battery is equal to the battery's EMF when:
- a) no current is drawn from the battery
 - b) a very large current is drawn from the battery
 - c) the internal resistance of the battery is very large
 - d) the resistance in the external circuit is small

ANSWER: A -- NO CURRENT IS DRAWN FROM THE BATTERY

BONUS

8. PHYS; Multiple Choice: To convert a galvanometer to a voltmeter, you should add a:
- a) high resistance in series
 - b) high resistance in parallel
 - c) low resistance in series
 - d) low resistance in parallel

ANSWER: A -- HIGH RESISTANCE IN SERIES

TOSS-UP

9. ERSC; Multiple Choice: Which of the following areas is closest to the total surface area of the earth in square kilometers?
- a) 500 thousand
 - b) 500 million
 - c) 5 billion
 - d) 500 billion

ANSWER: B -- 500 MILLION

BONUS

9. ERSC; Multiple Choice: It is 9:00 p.m. in Greenwich, England. You are on a ship whose local time is 6:00 p.m. What is the longitude of your ship?
- a) 30 degrees east
 - b) 45 degrees east
 - c) 30 degrees west
 - d) 45 degrees west

ANSWER: D-- 45 DEGREES WEST

TOSS-UP

10. CHEM; Multiple Choice: Which bond has the LEAST ionic character?
- a) H - F (read: H, F)
 - b) Li - F (read: L, i, F)
 - c) Li - Br (read: L, i, B, r)
 - d) F - F (read: F, F)

ANSWER: D -- F - F

BONUS

10. CHEM; Short Answer: Jaroslav Heyrovsky (pron: Ha'vra-ski) of Czechoslovakia received the 1959 Nobel Prize in chemistry for developing what technique used in chemical analysis?

ANSWER: POLAROGRAPHY

TOSS-UP

11. BIOL; Short Answer: What blood type is referred to as the universal RECIPIENT?

ANSWER: AB

BONUS

11. BIOL; Multiple Choice: Exchange of oxygen, carbon dioxide, nutrients and waste products from mother to fetus occurs through diffusion across the:

- a) chorionic villi (pron: core-e-on'-ick villi)
- b) endometrium (pron: en-doe-me'tree-um)
- c) corpus luteum
- d) colostrum (pron: co-lah'strum)

ANSWER: A -- CHORIONIC VILLI

TOSS-UP

12. CHEM; Multiple Choice: Harold Clayton Urey, an American, received the Nobel Prize in chemistry for his discovery of:

- a) Francium
- b) Americium
- c) deuterium
- d) protium

ANSWER: C -- DEUTERIUM

BONUS

12. CHEM; Multiple Choice: The inventor of the Kelvin temperature scale was:

- a) K. Cavendish II
- b) Lord William H. Harrison
- c) Sir William Thomson
- d) Michael Faraday

ANSWER: C -- SIR WILLIAM THOMSON (Lord Kelvin)

TOSS-UP

13. MATH; Multiple Choice: What is the probability that when two dice are rolled, the sum on the dice is 3?

- a) $\frac{1}{6}$
- b) $\frac{1}{18}$
- c) $\frac{1}{12}$
- d) $\frac{1}{9}$

ANSWER: B -- $\frac{1}{18}$

BONUS

13. MATH; Multiple Choice: The diagonal of the floor of a rectangular closet is $7\frac{1}{2}$ feet. The shorter side is $4\frac{1}{2}$ feet. What is the area of the closet floor in square feet?

- a) 37
- b) 21
- c) 54
- d) 27

ANSWER: D -- 27

TOSS-UP

14. GENR; Multiple Choice: The word atom is from a Greek word meaning:

- a) small
- b) indivisible
- c) unseen
- d) visible

ANSWER: B -- INDIVISIBLE

BONUS

14. GENR; Short Answer: Name the famous mathematician/physicist who was born in the year Galileo died.

ANSWER: (ISAAC) NEWTON

TOSS-UP

15. BIOL; Short Answer: A codon consists of three nucleotides. There are four possible nucleotides, each of which has an equal probability of being in any one of the three spots. How many possible codons exist?

ANSWER: 64

BONUS

15. BIOL; Multiple Choice: Which of the following is NOT a hormone associated with male reproductive physiology:

- a) testosterone
- b) prolactin
- c) leutenizing hormone
- d) follicle-stimulating hormone

ANSWER: B -- PROLACTIN

TOSS-UP

16. ASTR; Multiple Choice: The 2.7 Kelvin cosmic background radiation is concentrated in what region of the electromagnetic spectrum?

- a) radio
- b) infrared
- c) visible
- d) ultraviolet

ANSWER: A -- RADIO

BONUS

16. ASTR; Short Answer: Algol (pron: AL-gall), the Demon star, is a binary star whose larger component revolves around and regularly eclipses the smaller, brighter star causing periodic changes in brightness. The constellation that Algol is in is also noted for meteor showers that appear annually in August. Name the constellation.

ANSWER: PERSEUS (pron: PER-see-us)

TOSS-UP

17. PHYS; Multiple Choice: The greatest induced EMF will occur in a straight wire moving at constant speed through a uniform magnetic field when the angle between the direction of the wire's motion and the direction of the magnetic field is

- a) 0 degrees
- b) 30 degrees
- c) 60 degrees
- d) 90 degrees

ANSWER: D -- 90 DEGREES

BONUS

17. PHYS; Multiple Choice: A 10 volt battery connected to a capacitor delivers a charge of 0.5 coulombs. The capacitance of the capacitor is:

- a) 0.02 farads
- b) 0.05 farads
- c) 2 farads
- d) 5 farads

ANSWER: B -- 0.05 FARADS

TOSS-UP

18. CHEM; Multiple Choice: "Under the same conditions of temperature and pressure, the volumes of reacting gases and of their gaseous products are expressed in ratios of small whole numbers." This law is attributed to:

- a) Dalton
- b) Gay-Lussac
- c) Ramsay
- d) Avogadro

ANSWER: B -- GAY-LUSSAC

BONUS

18. CHEM; Multiple Choice: The type of crystal lattice exemplified in a diamond is:

- a) ionic crystal
- b) covalent molecular crystal
- c) metallic crystal
- d) covalent network crystal

ANSWER: D -- COVALENT NETWORK CRYSTAL

TOSS-UP

19. ERSC; Multiple Choice: Field capacity represents the maximum quantity of water held:

- a) in the soil against the force of gravity
- b) in the ground water zone
- c) in the intermediate zone
- d) below the water table

ANSWER: A -- IN THE SOIL AGAINST THE FORCE OF GRAVITY

BONUS

19. ERSC; Multiple Choice: Trade winds are persistent easterly winds developed between:

- a) subtropical high pressure and equatorial doldrum
- b) subtropical high pressure and subpolar low pressure
- c) westerlies and polar highs
- d) none of the above

ANSWER: A -- SUBTROPICAL HIGH PRESSURE AND EQUATORIAL DOLDRUM

TOSS-UP

20. COMP; Short Answer: You are programming in BASIC on your PC. What statement do you use in your program if you want the program to stop so that you can assign a value to a variable.

ANSWER: INPUT (also accept GET or INKEY)

BONUS

20. COMP; Short Answer: What standard procedure in Pascal opens a file for writing?

ANSWER: REWRITE

TOSS-UP

21. BIOL; Multiple Choice: Humans can produce energy by:

- a) anaerobic respiration
- b) aerobic respiration
- c) neither anaerobic nor aerobic respiration
- d) both anaerobic and aerobic respiration

ANSWER: D -- BOTH ANAEROBIC AND AEROBIC RESPIRATION

BONUS

21. BIOL; Multiple Choice: Genetic elements that can replicate independently of the cell's chromosomes are called:

- a) clones
- b) episomes
- c) repressors
- d) promoters

ANSWER: B -- EPISOMES

TOSS-UP

22. MATH; Short Answer: What is the area of a trapezoid, in square meters, that has a height of 4 meters and parallel sides of length 3 and 4 meters?

ANSWER: 14 (SQUARE METERS)

BONUS

22. MATH; Short Answer: What is the log of 25 to the base 5?

ANSWER: 2

TOSS-UP

23. PHYS; Multiple Choice: The Michelson interferometer was designed to study the nature of:

- a) water waves
- b) sound waves
- c) sunlight
- d) an "ether"

ANSWER: D -- AN "ETHER"

BONUS

23. PHYS; Multiple Choice: Light is normally incident on a thin soap film and is reflected. If the wavelength of this light is "L" and the index of refraction of the soap film is "N", complete destructive interference will occur for a film thickness of:

- a) $L / 8N$ (read: L divided by 8N)
- b) $L / 4N$ (read: L divided by 4N)
- c) $L / 2N$ (read: L divided by 2N)
- d) $3L / 4N$ (read: 3L divided by 4N)

ANSWER: C -- $L / 2N$

TOSS-UP

24. CHEM; Multiple Choice: Mayonnaise is:

- a) a coalescent (pron: co-uh-less'cent) solution
- b) a hydrogenated oil
- c) a covalent solution
- d) an emulsion

ANSWER: D -- AN EMULSION

BONUS

24. CHEM; Multiple Choice: The loss of water of crystallization from a hydrate when exposed to air is termed:

- a) efflorescence (pron: eh-floor-es-ence)
- b) deliquescence (pron: del-i-kwes-ence)
- c) quiescence (pron: kwi-es-ence)
- d) anhydrogenation

ANSWER: A -- EFFLORESCENCE

TOSS-UP

25. PHYS; Multiple Choice: An x-ray photon collides with a free electron, and the photon is scattered. During this collision there is conservation of:
- a) momentum but not energy
 - b) neither momentum nor energy
 - c) energy but not momentum
 - d) both momentum and energy

ANSWER: D -- BOTH MOMENTUM AND ENERGY

BONUS

25. PHYS; Multiple Choice: A car is moving along a straight horizontal road at a speed of 20 meters per second. The brakes are applied and a constant force of 5000 Newtons decelerates the car to a stop in 10 seconds. The mass of the car is:
- a) 1250 kilograms
 - b) 2500 kilograms
 - c) 5000 kilograms
 - d) 10,000 kilograms

ANSWER: B -- 2500 KILOGRAMS
